

CLAIMS:

1. A method of writing data on magnetic stripe of a smart card by imposing magnetic field of a given polarity on each selected segment of the magnetic stripe, such that data on the magnetic stripe can be read by a magnetic card reader and interpreted as digital bits, comprising:

(i) providing a multi-dimensional conductor array placed proximate to the magnetic stripe, the number of conductors in the array is considerably smaller than the number of segments, and each segment is associated with at least two conductors;

(ii) providing current drivers for sending currents in controlled direction through the conductor array;

(iii) sending currents, using said current drivers, through conductors of the array, such that for each one of the selected segment composite currents flowing through it's associated at least two conductors overcome the coersivity of the segment of the magnetic stripe.

2. The method according to Claim 1, wherein each segment is a magnetic domain, and wherein data read from two succeeding domains corresponds to one bit.

3. The method according to Claims 1 or 2, wherein said data bits comply with the *Aiken Biphase* code.

4. The method according to anyone of the preceding Claims, wherein said array of conductors includes first array of conductors for sending currents in one direction and second array of conductors for sending currents in opposite direction.

5. The method according to anyone of the preceding Claims, wherein said multi-dimensional conductor array being a two-dimensional matrix conductor array.

6. The method according to Claim 5, wherein said two-dimensional matrix conductor array includes X conductors in the row dimension of the matrix and Y conductors in the column dimension of the matrix, such that each domain is associated with a unique entry (i,j) identified by a conductor *i* in the row dimension and conductor *j* in the column dimension of the matrix;

and wherein sending currents, using said current drivers, stipulated in (iii) includes sending a current through the *i* conductor and sending a current through the *j* conductor where the sum of the *i* current and the *j* current overcomes the coersivity of the respective domain.

7. The method according to claims 5 or 6, wherein said $X=Y$ and wherein said I current and j current are of identical magnitude.

8. The method according to anyone of Claims 6 and 7, wherein said provision of two dimensional matrix includes provision of a matrix layout such that each of said X and Y conductors have a square waveform like shape and active conductor segments of each i,j , conductors are placed proximate and substantially parallel to their associated domain.

9. The method according to anyone of the Claims 1 to 4, wherein said multi-dimensional conductor array being a three-dimensional matrix conductor array.

10. The method according to anyone of the preceding Claims, wherein said magnetic stripe of the smart card includes four tracks.

11. The method according to Claim 10, wherein said 4 tracks magnetic stripe complies with the *American National Standards Institute (ANSI) & ISO/IEC*.

12. The method according to anyone of the preceding Claims, wherein the magnetic stripe layer is placed on top of the multi-dimensional conductor array.

13. The method according to anyone of the preceding Claims, wherein the magnetic stripe layer is placed on top of the multi-dimensional conductor array.

14. The method according to anyone of the preceding Claims, wherein said smart card being credit or debit card.

15. The method according to Claim 14, wherein said smart card serves as a multi-card credit or debit card.

16. A method for statically emulating a magnetic stripe, such that data can be read by a magnetic card reader and interpreted as digital bits, comprising:

a) providing in a smart card a conductor array proximate card's surface;
b) providing current drivers for sending currents in controlled direction through the conductor array ; and

c) sending currents, using said current drivers, through conductors of the array, for generating magnetic field of sufficient magnitude so as to be read by the magnetic card reader and interpreted as digital bits, while the card is being swiped for reading.

17. The method according to Claim 16, wherein said conductor array includes at least one conductor for each emulated magnetic domain.

18. The method according to Claim 16, wherein said conductor array being multi-dimensional conductor array. The method according to Claim 16, wherein said multi-dimensional conductor array, being a two-dimensional matrix.

19. The method according to Claim 16, wherein said multi-dimensional
5 conductor array, being a three-dimensional matrix.

20. The method according to anyone of the Claims 15 to 19, wherein said emulation being for four tracks magnetic stripe.

21. The method according to Claim 20, wherein said four tracks emulated magnetic stripe comply with the *American National Standards Institute (ANSI) &*
10 *ISO/IEC*.

22. A method for dynamically emulating a magnetic stripe, such that data can be read by a magnetic card reader and interpreted as digital bits, comprising:

- (i) providing at least one conductor proximate the card surface;
- (ii) providing at least one current driver for sending current through the at
15 least one conductor; and
- (iii) sending variable current, using said at least one current driver, through the at least one conductor, for generating magnetic field of sufficient magnitude so as to be read by the magnetic card reader and interpreted as digital bits.

20 23. The method according to Claim 22, wherein said (iii) is performed whilst obviating the need to swipe the card during reading.

24. The method according to Claims 22 or 23, wherein said conductor being an elongated electronic transducer extending along major portion of the longitudinal extent of the card.

25 25. The method according to anyone of the Claims 22 to 24, wherein said emulation being for four tracks magnetic stripe, and wherein at least one conductor is provided for each emulated track.

26. The method according to Claim 25, wherein said four tracks emulated magnetic stripe comply with the *American National Standards Institute (ANSI) &*
30 *ISO/IEC*.

27. The method according to anyone of Claims 22 to 26, wherein said variable current, changes over time in compliance with the *Aiken Biphase* code.

28. The method according to anyone of Claims 22 to 27, further comprising providing magnetic coupling between the write head of a magnetic stripe writer and the at least one conductor, for entering data to the smart card.

29. A method for writing data onto a smart card, using magnetic card writer,
5 comprising:

- a) providing at least one conductor proximate the card surface ;
- b) providing magnetic coupling between the write head of a magnetic stripe writer and the at least one conductor, for entering data to the smart card.

30. The method according to Claim 29, wherein said (ii) is performed whilst
10 obviating the need to swipe the card during writing.

31. The method according to Claims 29 or 30, wherein said conductor being an elongated electronic transducer extending along major portion of the longitudinal extent of the card.

32. The method of claim 31 where the transducer is a Hall-effect device.

15 33. The method according to anyone of the Claims 29 to 32, wherein said data writing being for four tracks, and wherein at least one conductor is provided for each track.

34. The method according to Claim 33, wherein said four tracks comply with the *American National Standards Institute (ANSI) & ISO/IEC*.

20 35. The method according to anyone of Claims 29 to 34, wherein said variable current, changes over time in compliance with the *Aiken Biphase* code.

36. The method according to anyone of the Claims 16 to 21, wherein said smart card being credit or debit card.

25 37. The method according to Claim 36, wherein said smart card serves as a multi-card credit or debit card.

38. The method according to anyone of the Claims 22 to 28, wherein said smart card being credit or debit card.

39. The method according to Claim 38, wherein said smart card serves as a multi-card credit or debit card.

30 40. The method according to anyone of the Claims 29 to 35, wherein said smart card being credit or debit card.

41. The method according to Claim 40, wherein said smart card serves as a

multi-card credit or debit card.

42. A method for writing data on a magnetic stripe of a magnetic card, comprising:

- (i) providing a conductor array proximate to the magnetic stripe;
- 5 (ii) providing current drivers for sending currents in controlled direction through the conductor array; and
- (iii) sending currents, using said current drivers, through conductors of the array, for generating magnetic field of sufficient magnitude so as to overcome the coersivity of the magnetic stripe.

10 43. The method according to Claim 42, wherein said conductor array includes at least one conductor for each magnetic domain in the magnetic stripe.

44. The method according to Claim 42, wherein said conductor array being multi-dimensional conductor array.

15 45. The method according to Claim 44, wherein said multi-dimensional conductor array, being a two-dimensional matrix.

46. The method according to Claim 44, wherein said multi-dimensional conductor array, being a three-dimensional matrix.

47. The method according to anyone of the Claims 42 to 46, wherein said writing being for four tracks magnetic stripe.

20 48. The method according to Claim 47, wherein said four tracks emulated magnetic stripe comply with the *American National Standards Institute (ANSI) & ISO/IEC*.

25 49. A system for writing data on magnetic stripe of a smart card by imposing magnetic field of a given polarity on each selected segment of the magnetic stripe, such that data on the magnetic stripe can be read by a magnetic card reader and interpreted as digital bits, comprising:

- a multi-dimensional conductor array placed proximate to the magnetic stripe, the number of conductors in the array is considerably smaller than the number of segments, and each segment is associated with at least two conductors;
- 30 current drivers for sending currents in controlled direction through the conductor array;
- a device for sending currents, using said current drivers, through conductors

of the array, such that for each one of the selected segment composite currents flowing through it's associated at least two conductors overcome the coersivity of the segment of the magnetic stripe.

50. A system for statically emulating a magnetic stripe, such that data can be
5 read by a magnetic card reader and interpreted as digital bits, comprising:

a conductor array, fitted in a smart card proximate the card's surface;
current drivers for sending currents in controlled direction through the

conductor array;

a device for sending currents, using said current drivers, through conductors
10 of the array, for generating magnetic field of sufficient magnitude so as to be read by the
magnetic card reader and interpreted as digital bits, while the card is being swiped for
reading.

51. A system for dynamically emulating a magnetic stripe, such that data can
be read by a magnetic card reader and interpreted as digital bits, comprising:

15 at least one conductor placed proximate the card surface;
at least one current driver for sending current through the at least one
conductor;

a device for sending variable current, using said at least one current driver,
through the at least one conductor, for generating magnetic field of sufficient magnitude
20 so as to be read by the magnetic card reader and interpreted as digital bits.

52. A system for writing data onto a smart card, using magnetic card writer,
comprising:

at least one conductor placed proximate the card surface;
means for providing magnetic coupling between the write head of a magnetic
25 stripe writer and the at least one conductor, for entering data to the smart card.

53. A system for writing data on a magnetic stripe of a card, comprising:

a conductor array capable of being placed proximate to the magnetic stripe;
current drivers configured to send currents in controlled direction through the

conductor array;

30 a device configured to sending currents, using said current drivers, through
conductors of the array, for generating magnetic field of sufficient magnitude so as to
overcome the coersivity of the magnetic stripe.

54. A system for writing data on a magnetic stripe of a card, comprising:
a writing device capable of writing data onto the magnetic stripe being placed
in proximity thereto; the writing device is characterized in having no moving parts.

55. The system according to Claim 49, wherein said device includes a
5 programmable device and associated input means and storage for storing information
indicative of plurality of cards and, in response to user selection, data is converted to
currents sent in controlled direction through the conductor array.

56. The system according to Claim 55, wherein said programmable device,
associated input means and storage form part of the card.

10 57. The system according to Claim 55, wherein said programmable device,
associated input means and storage, or parts thereof are accommodated in external
device communicating with the card.

58. The system according to Claim 57, wherein said external device being a
PDA or cellular telephone.

15 59. The system according to anyone of Claims 55 to 58, wherein said data
being at least one member selected from the group that includes: data indicative of a
selected card, data required to activate a card, data required to configure a new card, data
required to complete transaction.

20 60. The system according to Claim 50, wherein said device includes a
programmable device and associated input means and storage for storing information
indicative of plurality of cards and in response to user selection data is converted to
currents sent through the conductor array.

61. The system according to Claim 60, wherein said programmable device,
associated input means and storage form part of the card.

25 62. The system according to Claim 60, wherein said programmable device,
associated input means and storage, or parts thereof are accommodated in external
device communicating with the card.

63. The system according to Claim 62, wherein said external device being a
PDA or cellular telephone.

30 64. The system according to anyone of Claims 60 to 63, wherein said data
being at least one member selected from the group that includes: data indicative of a
selected card, data required to activate a card, data required to configure a new card, data

required to complete transaction.

65. The system according to Claim 51, wherein said device includes a programmable device and associated input means and storage for storing information indicative of plurality of cards and in response to user selection data is converted to
5 variable current sent to the at least one conductor.

66. The system according to Claim 65, wherein said programmable device, associated input means and storage form part of the card.

67. The system according to Claim 65, wherein said programmable device, associated input means and storage, or parts thereof are accommodated in external
10 device communicating with the card.

68. The system according to Claim 67, wherein said external device being a PDA or cellular telephone.

69. The system according to anyone of Claims 65 to 68, wherein said data being at least one member selected from the group that includes: data indicative of a
15 selected card, data required to activate a card, data required to configure a new card, data required to complete transaction.

70. A smart card storing information of multiple cards; said card includes processor and associated device capable of conveying data indicative of a selected card from among said plurality of cards, to a magnetic stripe of the smart card, so as to be
20 read by a magnetic card reader.

71. A smart card storing information of multiple cards; said card includes processor and associated device capable of emulating data indicative of a selected card from among said plurality of cards; said emulated data are capable of being read by a magnetic card reader.

25 72. A system of storing data indicative of multiple cards in a storage area of a programmable module; the system is capable of transferring data to a magnetic stripe of a card.

73. The system according to Claim 72, wherein said programmable module is fitted in external device capable of communicating with the card.

30 74. The system according to Claim 73, wherein said external device being PDA or cellular phone.

75. The system according to Claim 53, wherein said system includes a

programmable device and associated input means and storage for storing information indicative of plurality of cards and, in response to user selection, data is converted to currents sent in controlled direction through the conductor array.

76. The system according to Claim 75, wherein said programmable device,
5 associated input means and storage, conductor array and current drivers are all integral in the system.

77. The system according to Claim 75, wherein said programmable device, associated input means and storage, or parts thereof are accommodated in external device that is coupled to said conductor array and current drivers.

10 78. The system according to Claim 77, wherein said external device being a PDA or cellular telephone.

79. The system according to Claim 76, wherein said system is included in PDA or cellular telephone.

80. The system according to anyone of Claims 75 to 79, wherein said data
15 being at least one member selected from the group that includes: data indicative of a selected card, data required to activate a card, data required to configure a new card, data required to complete transaction.

81. The system according to Claim 54, wherein said system includes a programmable device and associated input means and storage for storing information
20 indicative of plurality of cards and, in response to user selection, data is converted to currents sent in controlled direction through the conductor array.

82. The system according to Claim 81, wherein said programmable device, associated input means and storage, conductor array and current drivers are all integral in the system.

25 83. The system according to Claim 81, wherein said programmable device, associated input means and storage, or parts thereof are accommodated in external device that is coupled to said conductor array and current drivers.

84. The system according to Claim 83, wherein said external device being a PDA or cellular telephone.

30 85. The system according to Claim 82, wherein said system is included in PDA or cellular telephone.

86. The system according to anyone of Claims 81 to 87, wherein said data

being at least one member selected from the group that includes: data indicative of a selected card, data required to activate a card, data required to configure a new card, data required to complete transaction.